REMARKS

Favorable reconsideration and allowance of the claims of the present application are respectfully requested.

Before addressing the specific grounds of rejection raised in the present Office Action, applicants have amended Claim 1 to positively recite that the carbon containing gas includes gas molecules having at least two carbon atoms. Support for this amendment to Claim 1 is found throughout the specification of the instant application, as well as in original Claim 3. Since the subject matter of Claim 3 has been included within Claim 1, Claim 3 has been cancelled.

In the present Office Action, Claims 1-2 and 7 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 6,403,976 to Saitoh, et al. ("Saitoh, et al."). Claim 3 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Saitoh, et al. and U.S. Patent No. 5,634,973 to Cabral, Jr. et al. ("Cabral, Jr. et al."). Claims 4-5 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Saitoh, et al. and U.S. Patent No. 5,929,259 to Lockemeyer ("Lockemeyer."). Claims 6 and 9 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Saitoh, et al. and U.S. Patent No. 5,477,023 to Schneider, et al. ("Schneider, Jr. et al."). Claim 8 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Saitoh, et al. and U.S. Patent No. 5,208,102 to Schulz, et al. ("Schulz, et al."). Claim 10 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Saitoh, et al. and U.S. Patent No. 6,180,497 to Sato, et al. ("Sato, et al."). Claim 11 stands rejected under 35 U.S.C. § 103 as allegedly unpatentable over the

combined disclosures of Saitoh, et al. and U.S. Patent No. 4,974,543 to Jansen ("Jansen.").

Concerning the § 102 rejection, it is axiomatic that anticipation under § 102 requires that the prior art reference disclose each and every element of the claim to which it is applied. In re King, 801 F.2d, 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1996). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: Absence from the applied reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Applicants submit that the claims of the present application are not anticipated by the disclosure of Saitoh, et al. since the applied reference does not disclose applicants' method recited in amended Claim 1. Specifically, Saitoh, et al. do not disclose a method for forming an alloy layer of silicon carbon on a silicon containing substrate comprising placing a wafer having a single crystalline silicon containing surface into a UHV CVD chamber, heating said silicon containing surface to a temperature in the range from about 475° - 850° C, and flowing a silicon containing gas and a *carbon containing gas including gas molecules having at least two carbon atoms* over said silicon containing surface whereby said silicon carbon alloy layer is formed.

Saitoh, et al. provide a method of forming a $Si_{1-x}Ge_x/Si_{1-y}C_y$ short-period supperlattice structure in which a single SiGeC layer is formed by alternately growing $Si_{1-x}Ge_x$ layers ($0<x<1$) and $Si_{1-y}C_y$ layers ($0<y<1$), each having a thickness corresponding to several atomic layers that is small enough to prevent discrete

quantization levels from being generated. In accordance with the disclosure of Saitoh, et al., the layers can be formed by UHV-CVD using Si_2H_6, GeH_4 and SiH_3CH_3 as sources of Si, Ge and C, respectively. See Col. 4, lines 48-56. The applied reference does not, however, disclose the claimed method in which the *carbon source includes gas molecules having at least two carbon atoms*.

Applicants observe that the Examiner refers to Col. 5, lines 34-43 for allegedly disclosing the claimed method. The method contained at that portion of Saitoh, et al. incorporates the C via ion implantation into previously formed layers of SiGe and Si. This disclosed method referred to by the Examiner clearly does not anticipate the claimed method since no *carbon containing gas including gas molecules having at least two carbon atoms* is used.

The foregoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention, as required by King and Kloster Speedsteel; therefore the claims of the present application are not anticipated by the disclosure of Saitoh, et al. Applicants respectfully submit that the instant § 102 rejection has been obviated and withdrawal thereof is respectfully requested.

With respect to the § 103 rejections, applicants submit that the claims of the present application are not rendered unpatentable by Saitoh, et al. in combination with one of Cabral, Jr. et al., Lockemeyer, Schneider, et al., Schulz, et al., Sato, et al. or Jansen. Specifically, none of the applied references teaches or suggests the claimed method which includes placing a wafer having a single crystalline silicon containing surface into a UHV CVD chamber, heating said silicon containing surface to a temperature in the range from about 475° - 850° C, and flowing a silicon containing gas

and a *carbon containing gas including gas molecules having at least two carbon atoms* over said silicon containing surface whereby said silicon carbon alloy layer is formed.

The principal reference, i.e., Saitoh, et al., spurring each of the obviousness rejections is defective for the same reasons discussed above under the anticipation rejection. Applicants thus incorporate the above comments herein by reference. To reiterate: Saitoh, et al. do not teach or suggest a method where a carbon containing gas including gas molecules having at least two carbon atoms is used. Instead, the C source disclosed in Saitoh, et al. has a single C atom.

Cabral, Jr. et al. do not alleviate the above defect in Saitoh, et al. since the applied reference also does not teach or suggest a UHV-CVD method in which the C source is a *carbon containing gas including gas molecules having at least two carbon atoms.* Cabral, Jr. et al. provide a method of forming epitaxial (epi) and polycrystalline (poly) SiGe alloys. In accordance with the disclosure of Cabral, Jr. et al., a UHV-CVD process is used to form Si and SiGe layers. See, for example, the various examples in Cabral, Jr. et al.; in Example 1 a silane, SiH_4 and germane, GeH_4 are used. No carbon is taught or suggested to be present in the prior art Si and SiGe layers. Applicants observe that the Examiner refers to Col. 3, lines 38-41 for allegedly teaching the feature of a *carbon containing gas including gas molecules having at least two carbon atoms*. Applicants have carefully read that section of Cabral Jr., et al. but can find no reference to using a C source.

Lockemeyer does not alleviate the above defect in Saitoh, et al. since the applied secondary reference also does not teach or suggest a UHV-CVD method in which the C source is a *carbon containing gas including gas molecules having at least two carbon atoms*. Lockemeyer provides a process for preparing an ethylene oxide catalyst by

depositing silver and one or more alkali metal promoters on an alpha alumina carrier. Applicants observe that the Examiner relies on Col. 11, line 61-Col. 12, line 4 of the prior art for allegedly disclosing a UHV-CVD method in which the carbon source is a *carbon containing gas including gas molecules having at least two carbon atoms*. Applicants note that the section referred to in Lockemeyer by the Examiner relates to a process for selective epoxidation of olefins having three carbon atoms. Applicants find no teaching or suggestion of a method of forming a SiC layer using a *carbon containing gas including gas molecules having at least two carbon atoms*. The catalyst preparation method disclosed in Lockemeyer represents non-analogous art which has nothing to do with the claimed method or the problem solved by the claimed method. See, MPEP 2141.01 (a) for a general discussion of analogous and non-analogous art. Hence, the disclosure of Lockemeyer should not be cited in this instance.

Schneider, et al. do not alleviate the above defect in Saitoh, et al. since the applied reference also does not teach or suggest a UHV-CVD method in which the C source is a *carbon containing gas including gas molecules having at least two carbon atoms*. Schneider, et al. provide a system and method for engraving an image on a workpiece. Applicants observe that the Examiner relies on Col. 8, lines 26-30 of the prior art for allegedly disclosing a UHV-CVD method in which the carbon source is a *carbon containing gas including gas molecules having at least two carbon atoms*. Applicants note that the section referred to in Schneider, et al. by the Examiner (Col. 8, lines 26-30) discusses that a solid Nd:YAG crystal 215 of the laser used in the engraving system of Schneider, et al. can be replaced with a suitable gas such as CO_2 or the like that is capable of being excited by appropriate electrical means to emit electromagnetic radiation. Applicants find no teaching or suggestion of a method of forming a SiC layer using a

carbon containing gas including gas molecules having at least two carbon atoms. The laser engraving system disclosed in Schneider, et al. represents non-analogous art which has nothing to do with the claimed method or the problem solved by the claimed method. See, MPEP 2141.01 (a) for a general discussion of analogous and non-analogous art. Hence, the disclosure of Schneider, et al. should not be cited in this instance.

Schulz, et al. do not alleviate the above defect in Saitoh, et al. since the applied secondary reference also does not teach or suggest a UHV-CVD method in which the C source is a *carbon containing gas including gas molecules having at least two carbon atoms*. Instead, Schulz, et al. provide an article that includes a coated highly wear-resistant tool having an $Me^1_{1-x}(\alpha_2\ Me^{2*}\ \alpha_3\ Me^{3*} \ldots \alpha_n Me^n)N_uC_vO_w$ coating, wherein Me^1 is a metal from Group IVb of the Periodic Table of Elements and Me^2, Me^3 ... Me^n are other metals. In accordance with Schulz, et al., u+v+w=1 and the Me concentration changes at least once continuously over the layer thickness to $\alpha_2\ Me^{2*}\ \alpha_3\ Me^{3*} \ldots \alpha_n Me^n$. Applicants observe that Schulz, et al. disclose a method in which the nitrogen element of the wear resistant coating is introduced via a reactive nitrogen atmosphere or a nitrogen/oxygen mixture with a C gas source such as acetylene and ethane. See Col. 4, lines 30-34. The wear resistant coating and method of making the same disclosed in Schulz, et al. represents non-analogous art which has nothing to do with the claimed method or the problem solved by the claimed method. See, MPEP 2141.01 (a) for a general discussion of analogous and non-analogous art. Hence, the disclosure of Schulz, et al. should not be cited in this instance.

Sato, et al. do not alleviate the above defect in Saitoh, et al. since the applied reference also does not teach or suggest a UHV-CVD method in which the C source is a *carbon containing gas including gas molecules having at least two carbon atoms.* Sato,

et al. provide a method of producing a semiconductor base member that can be used as a silicon-on-insulator (SOI) wafer. In accordance with the method disclosed in Sato, et al. a porous layer having a surface comprising atom steps and terraces is formed on a non-porous layer. Applicants observe that at Col. 7, lines 6-7 Sato, et al. disclose that an epi Si layer can be formed by UHV-CVD using Si-containing precursors. Applicants respectfully submit that Sato, et al. do not teach or suggest a method of forming a SiC layer hence there is no C source employed in the prior art process. Since Sato, et al. do not teach or suggest a method in which a SiC layer is formed from a C source having at least C atoms, the combination thereof with Saitoh, et al. does not render the claimed method obvious.

Jansen does not alleviate the above defect in Saitoh, et al. since the applied reference also does not teach or suggest a UHV-CVD method in which the C source is a *carbon containing gas including gas molecules having at least two carbon atoms*. Jansen provides an apparatus for preparing plasma deposited films, especially amorphous Si films. The apparatus includes a gas exhaust means where silane and dopants such as diborane and/or phosphine can be introduced into a reactor chamber Applicants respectfully submit that Jansen does not teach or suggest a method of forming a SiC layer hence there is no C source employed in the prior art process. Since Jansen does not teach or suggest a method in which a SiC layer is formed from a C source having at least C atoms, the combination thereof with Saitoh, et al. does not render the claimed method obvious.

The various § 103 rejections fail because there is no motivation in the applied references which suggest modifying the disclosed methods to include the various features, including the specific C source, recited in the claims of the present invention.

Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991). Moreover, there would be no motivation to combine Lockemeyer (ethylene oxide catalyst for epoxidation reactions), Schneider, et al. (a laser engraving system) and Schulz, et al. (a wear resistant coated tool) with Saitoh, et al. since those secondary references represent non-analogous art which has nothing to do with the claimed subject matter of forming a SiC film.

The rejections under 35 U.S.C. § 103 have been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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